

Status of All Claims in th Application:

1. (Currently Amended) A device stage assembly that moves a device relative to a mounting base having a surface, the device stage assembly comprising:

a device stage that retains the device, the device stage being movable relative to the surface of the mounting base;

a mover housing that is movable relative to the surface of the mounting base;

a support assembly that moves the device stage relative to the mover housing along a Z axis that is perpendicular to the surface of the mounting base, the support assembly including at least four, spaced apart Z device stage movers that are connected to the device stage; and

a control system that controls the Z device stage movers to inhibit deformation of the device stage during movement of the device stage by the Z device stage movers.

2. (Original) The device stage assembly of claim 1 wherein the control system controls the Z device stage movers to inhibit dynamic deformation of the device stage during movement of the device stage by the Z device stage movers.

3. (Original) The device stage assembly of claim 1 wherein the control system controls the Z device stage movers to minimize static deformation of the device stage.

4. (Currently Amended) The device stage assembly of claim 1 wherein the control system controls the Z device stage movers to adjust the position of the device stage relative to the mover housing along a the Z axis.

5. (Currently Amended) The device stage assembly of claim 1 wherein the control system controls the Z device stage movers to adjust the position of the device stage relative to the mover housing along a the Z axis, about a an X axis, and about a Y axis.

6. (Currently Amended) The device stage assembly of claim 5 wherein the support assembly includes an X device stage mover that is controlled by the control system to move the device stage relative to the mover housing along ~~an~~ the X axis.

7. (Original) The device stage assembly of claim 5 wherein the support assembly includes a first X device stage mover, a second X device stage mover and a Y device stage mover that are controlled by the control system to move the device stage relative to the mover housing along the X axis, along the Y axis, and about the Z axis.

8. (Original) The device stage assembly of claim 1 further comprising a bending sensor that monitors the bending of the device stage.

9. (Original) The device stage assembly of claim 8 wherein the control system controls the Z device stage movers to minimize the bending measured by the bending sensor.

10. (Original) The device stage assembly of claim 1 including a stage mover assembly connected to the mover housing, the stage mover assembly moving the mover housing with at least one degree of freedom relative to the mounting base.

11. (Original) An exposure apparatus including the device stage assembly of claim 1.

12. (Original) The exposure apparatus of claim 11 further comprising (i) a stage base that supports the mover housing, and (ii) a base support assembly that moves the stage base relative to the mounting base, the base support assembly including at least four, spaced apart Z base movers that move the stage base relative to the mounting base and wherein the control system controls the Z base movers to inhibit bending of the stage base during movement of the base stage by the Z base movers.

13. (Original) The exposure apparatus of claim 12 including a base bending sensor that monitors the bending of the stage base.

14. (Original) The exposure apparatus of claim 11 further comprising (i) an apparatus frame that supports a portion of the device stage assembly above the mounting base, and (ii) a frame support assembly that moves the apparatus frame relative to the mounting base, the frame support assembly including at least four, spaced apart Z frame movers that move the apparatus frame relative to the mounting base and wherein the control system controls the Z frame movers to inhibit bending of the apparatus frame during movement of the apparatus frame by the Z frame movers.

15. (Original) The exposure apparatus of claim 14 including a frame bending sensor that monitors the bending of the apparatus frame.

16. (Original) A device manufactured with the exposure apparatus according to claim 11.

17. (Original) A wafer on which an image has been formed by the exposure apparatus of claim 11.

18. (Currently Amended) A support assembly that supports and moves a stage relative to a mounting base, the support assembly comprising:

a plurality of spaced apart Z stage movers that are connected to the stage;
and

a sensor coupled to the stage to monitor the bending of the stage; and
a control system that controls the Z stage movers to move the stage in accordance with an output of the sensor while inhibiting dynamic bending of the stage during movement of the stage by the Z stage movers.

19. (Original) The support assembly of claim 18 including at least four spaced apart Z stage movers.

20. (Original) The support assembly of claim 18 further comprising a bending sensor that monitors bending of the stage.

21. (Original) The support assembly of claim 19 wherein the control system controls the Z stage movers to minimize the bending measured by the bending sensor.

22. (Currently Amended) The support assembly of claim 18 wherein the Z stage movers are controlled by the control system to move the stage along a Z axis, about a an X axis, and about a Y axis.

23. (Original) The support assembly of claim 22 further comprising a first X stage mover, a second X stage mover and a Y stage mover that are controlled by the control system to move the stage along the X axis, along the Y axis, and about the Z axis.

24. (Original) The device stage assembly for mounting a device, the device stage assembly including the support assembly of claim 18, and a stage that retains the device.

25. (Original) An exposure apparatus including the device stage assembly of claim 24.

26. (Original) A device manufactured with the exposure apparatus according to claim 25.

27. (Original) A wafer on which an image has been formed by the exposure apparatus of claim 25.

28-31. (Canceled)

32. (Currently Amended) A method for making a device stage assembly that moves a device relative to a stage base, the method comprising the steps of:

providing a device stage that retains the device, the device stage being movable relative to a surface of the stage base;

providing a mover housing that is movable relative to the surface of the stage base with the device stage;

connecting a support assembly between the device stage and the mover housing, the support assembly including a plurality of spaced apart Z device stage movers that move the device stage relative to the mover housing along a Z axis that is perpendicular to the surface of the stage base; and

connecting a controller with the plurality of spaced apart Z device stage movers, the controller controlling the Z device stage movers to inhibit dynamic bending of the device stage during movement of the device stage by the Z device stage movers.

33. (Original) The method of claim 32 wherein the step of connecting a support assembly including providing a support assembly that includes at least four spaced apart Z device stage movers.

34. (Currently Amended) The method of claim 32 wherein the control system controls at least one of the Z device stage movers to adjust the position of the device stage relative to the mover housing along a the Z axis, about a an X axis, and about a Y axis.

35. (Original) The method of claim 32 further comprising the steps of connecting a bending sensor with the control system, the bending sensor monitoring the bending of the device stage.

36. (Original) The method of claim 35 wherein the control system controls at least one of the Z device stage movers to minimize the bending measured by the bending sensor.

37. (Currently Amended) The method of claim 32 including the step of connecting a first X device stage mover, a second X device stage mover and a Y device stage mover to the device stage, the X device stage movers and the Y device stage mover being controlled by the control system to move the device stage relative to the mover housing along an X axis, along a Y axis and about a the Z axis.

38. (Original) A method for making an exposure apparatus that forms an image on a wafer, the method comprising the steps of:

providing an irradiation apparatus that irradiates the wafer with radiation to form the image on the wafer; and

providing the device stage assembly made by the method of claim 32.

39. (Original) A method of making a wafer utilizing the exposure apparatus made by the method of claim 38.

40. (Original) A method of making a device including at least the exposure process, wherein the exposure process utilizes the exposure apparatus made by the method of claim 38.

41. (Canceled)

42. (Re-presented – formerly dependent claim 4) A device stage assembly that moves a device relative to a mounting base, the device stage assembly comprising:

- a device stage that retains the device;
- a mover housing;
- a support assembly that moves the device stage relative to the mover housing, the support assembly including at least four, spaced apart Z device stage movers that are connected to the device stage; and
- a control system that controls the Z device stage movers to inhibit deformation of the device stage during movement of the device stage by the Z device stage movers, and to adjust the position of the device stage relative to the mover housing along a Z axis.

43. (New) The device stage assembly of claim 42 wherein the control system controls the Z device stage movers to adjust the position of the device stage relative to the mover housing about an X axis and about a Y axis.

44. (New) The device stage assembly of claim 43 wherein the support assembly includes an X device stage mover that is controlled by the control system to move the device stage relative to the mover housing along the X axis.

45. (New) The device stage assembly of claim 43 wherein the support assembly includes a first X device stage mover, a second X device stage mover and a Y device stage mover that are controlled by the control system to move the device stage relative to the mover housing along the X axis, along the Y axis, and about the Z axis.

46. (Re-presented - formerly dependent claim 10) A device stage assembly that moves a device relative to a mounting base, the device stage assembly comprising:

- a device stage that retains the device;
- a mover housing;

a stage mover assembly connected to the mover housing, the stage mover assembly moving the mover housing with at least one degree of freedom relative to the mounting base.

a support assembly that moves the device stage relative to the mover housing, the support assembly including at least four, spaced apart Z device stage movers that are connected to the device stage; and

a control system that controls the Z device stage movers to inhibit deformation of the device stage during movement of the device stage by the Z device stage movers.

47. (Re-presented - formerly dependent claim 12) An exposure apparatus that moves a device relative to a mounting base, the exposure apparatus comprising:

a device stage assembly including (i) a device stage that retains the device, (ii) a mover housing, (iii) a support assembly that moves the device stage relative to the mover housing, the support assembly including at least four, spaced apart Z device stage movers that are connected to the device stage, and (iv) a control system that controls the Z device stage movers to inhibit deformation of the device stage during movement of the device stage by the Z device stage movers;

a stage base that supports the mover housing; and

a base support assembly that moves the stage base relative to the mounting base, the base support assembly including at least four, spaced apart Z base movers that move the stage base relative to the mounting base and wherein the control system controls the Z base movers to inhibit bending of the stage base during movement of the base stage by the Z base movers.

48. (New) The exposure apparatus of claim 47 including a base bending sensor that monitors the bending of the stage base.

49. (Re-presented - formerly dependent claim 14) An exposure apparatus that moves a device relative to a mounting base, the exposure apparatus comprising:

a device stage assembly including (i) a device stage that retains the device, (ii) a mover housing, (iii) a support assembly that moves the device stage relative to the mover housing, the support assembly including at least four, spaced apart Z device stage movers that are connected to the device stage, and (iv) a control system that controls the Z device stage movers to inhibit deformation of the device stage during movement of the device stage by the Z device stage movers;

an apparatus frame that supports a portion of the device stage assembly above the mounting base; and

a frame support assembly that moves the apparatus frame relative to the mounting base, the frame support assembly including at least four, spaced apart Z frame movers that move the apparatus frame relative to the mounting base and wherein the control system controls the Z frame movers to inhibit bending of the apparatus frame during movement of the apparatus frame by the Z frame movers.

50. (New) The exposure apparatus of claim 49 including a frame bending sensor that monitors the bending of the apparatus frame.

51. (Re-presented - formerly dependent claim 22) A support assembly that supports and moves a stage relative to a mounting base, the support assembly comprising:

a plurality of spaced apart Z stage movers that are connected to the stage; and

a control system that controls the Z stage movers to move the stage along a Z axis, about a X axis, and about a Y axis while inhibiting dynamic bending of the stage during movement of the stage by the Z stage movers.

52. (New) The support assembly of claim 51 further comprising a first X stage mover, a second X stage mover and a Y stage mover that are controlled by the control system to move the stage along the X axis, along the Y axis, and about the Z axis.

53. (Re-presented - formerly dependent claim 28) A base stage assembly comprising:

a stage base;

a stage;

a mounting base; and

a support assembly that is connected to the stage base, the support assembly supporting and moving the stage relative to the mounting base, the support assembly including (i) a plurality of spaced apart Z stage movers that are connected to the stage; and (ii) a control system that controls the Z stage movers to move the stage while inhibiting dynamic bending of the stage during movement of the stage by the Z stage movers.

54. (New) The base stage assembly of claim 53 including a base bending sensor that monitors the bending of the stage base.

55. (Re-presented - formerly dependent claim 30) A frame stage assembly comprising:

an apparatus frame;

a stage;

a mounting base; and

a support assembly that is connected to the apparatus frame, the support assembly supporting and moving the stage relative to the mounting base, the support assembly including (i) a plurality of spaced apart Z stage movers that are connected to the stage; and (ii) a control system that controls the Z stage movers to move the stage while inhibiting dynamic bending of the stage during movement of the stage by the Z stage movers.

56. (New) The frame stage assembly of claim 55 further comprising a frame bending sensor that monitors the bending of the apparatus frame.